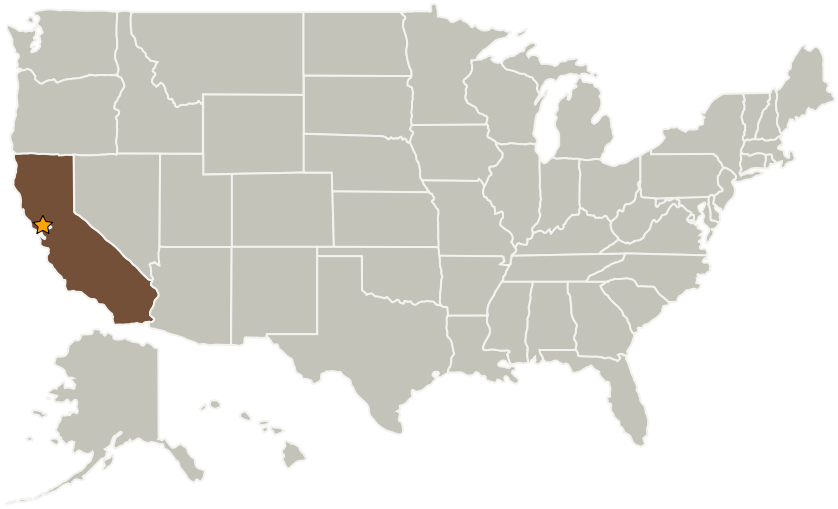
Powder Handling Device for X-ray Diffraction Analysis with Minimal Sample Preparation, Phase II

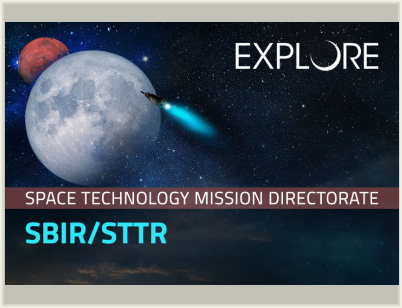
Completed Technology Project (2005 - 2007)

Project Introduction

This project consists in developing a Vibrating Powder Handling System for planetary X-Ray Diffraction instruments. The principle of this novel sample handling technique relies on vibrations generated in a sample holder to create movements in the powdered sample. The major benefit over conventional sample handling techniques is the possibility to characterize materials with grain-sizes up to two orders of magnitude larger, with no degradation in the data quality. It allows existing planetary sample-preparation systems such as rock crushers and drills to be used in place of fine-grinding mills normally required for quality XRD analysis. A secondary benefit is that it offers a simple means of loading and removal of samples, with potentially no moving parts. This research will answer a critical need for sample handling devices for conducting definitive mineralogical analyses in the Solar System. The Phase 2 effort will focus on addressing key technical issues in the development of a miniature Vibrating Powder Handling System. This work will lead to a brassboard prototype that can be remotely operated and interfaced to a planetary XRD instrument.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
inXitu, Inc.	Supporting Organization	Industry	Mountain View, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.3 Manipulation
    - TX04.3.4 Sample Acquisition and Handling